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**REMARKS**

Claim 1 is the sole independent claim and stands rejected under 35 U.S.C. § 102 as being anticipated by JP '518. This rejection is respectfully traversed for the following reasons.

The Examiner asserts that because JP '518 allegedly discloses a negative electrode having the same d<sub>002</sub> and mean particle size as in the present invention, then the resulting circularity of the negative electrode must not be less than 0.86. As a preliminary matter, it is respectfully submitted that the Examiner's allegation is technically incorrect in that the disclosed d<sub>002</sub> and mean particles size characteristics of the JP '518 electrode do not necessitate the claimed circularity characteristic. Indeed, it appears that JP '518 is directed to *flake* graphite, which presumably would be similar to the commercially available circularity of 0.84 described on page 7, line 13 of Applicants' specification.

The Examiner appears to believe that since JP '518 allegedly teaches the same carbon material having a d<sub>002</sub> of 0.3354 to 0.3357 nm and a mean particle size of 5 to 20 µm, the carbon material inherently has a circularity of not less than 0.86. However, it is respectfully submitted that the Examiner's allegation is technically incorrect. The interplanar spacing d<sub>002</sub> correlates with the graphitization degree, and the mean particle size merely correlates with the size of the particle. The interplanar spacing d<sub>002</sub> and the mean particle size do not correlate with circularity. In any event, the disclosed negative electrode of JP '518 does not *inherently* possess a circularity of not less than 0.86. In this regard, "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999).

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently (noting that "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999)), in a single prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir.

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1986), based on the forgoing, it is submitted that JP '518 does not anticipate claim 1, nor any claim dependent thereon.

Claim 1 is further rejected under 35 U.S.C. § 103 as being unpatentable over JP '518 in view of JP '612. This rejection is respectfully traversed for the following reasons.

It is respectfully submitted that the cited prior art does not disclose or suggest the claimed *combination*. Indeed, only Applicants have conceived of the novel *combination* of the claimed particle size, interplanar spacing, *etc.*, and the claimed circularity, *and the resulting effects that can be attributed thereby* in which new and unexpected results can be achieved evidencing the criticality of the claimed *combination*.

According to one aspect of the present invention, as described throughout Applicants' specification, a spherical natural graphite and a graphitized carbon fiber can be filled in the negative electrode material mixture layer at a density of not less than  $1.6 \text{ g/cm}^3$ . Attempts to achieve a density of  $1.6 \text{ g/cm}^3$  by rolling usually yield a fine powder because the carbon materials are broken down, ending up in an increased surface area of the negative electrode material. As a result, the irreversible capacity increases. Also, the basal planes of the carbon are oriented in parallel with the electrode plate surface on rolling, and therefore lithium ions can not easily migrate in the negative electrode. Consequently, high rate discharge characteristics decrease.

Turning to Applicants' specification, batteries R8 and R9 in Tables 1 and 2 evidence the aforementioned effects. The flak graphite used had a small circularity of 0.78 or 0.72, the shape of which was far from a sphere. When the flake graphite and the graphitized carbon fiber were filled at a carbon density of  $1.6 \text{ g/cm}^3$  or greater, the irreversible capacity (Re) increased to as

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large as 34 to 37 mAh/g. The high rate discharge characteristics (2C/0.2C) decreased to as low as 81 to 85%.

On the other hand, when the spherical natural graphite having a circularity of not less than 0.86 and the graphitized carbon fiber were filled at a carbon density of 1.6 g/cm<sup>3</sup> or greater (e.g., in the case of Battery B4), the irreversible capacity (Re) decreased to as small as 26 to 27 mAh/g. The high rate discharge characteristics (2C/0.2C) increased to as high as 90 to 91%. Such effect can be attained, as discovered by Applicants, when the spherical natural graphite having a circularity of not less than 0.86 is used in combination with the other recited features of the claimed combination.

Turning to the cited prior art, JP '518 discloses a negative electrode having a carbon density of 1.6 g/cm<sup>3</sup> (Examples 12 to 13) merely because the binder contains an acrylic rubbery copolymer; and not because the natural graphite is made to have a circularity of not less than 0.86, thereby teaching away from any effects which can be achieved by the combination thereof. In this regard, only Applicants have recognized the new/unexpected results obtainable from such a combination.

Indeed, JP '612 teaches that the particle density is adjusted to 1.4 g/cc (corresponding to a carbon density of 1.4 g/cm<sup>3</sup>); and does not suggest that the carbon density of the negative electrode should be 1.6 g/cm<sup>3</sup> or greater (see [0053] of JP '612), let alone in combination with a circularity of not less than 0.86. Indeed, page 10, lines 16-21 of Applicants' specification already acknowledge JP '612 in relation to a process by which to form the claimed circularity. In view of the unexpected results which can be achieved by the present application, which are not suggested by either JP '518 or JP '612, it is respectfully submitted that the claimed combination is not rendered obvious by the proposed combination. Specifically, only Applicants

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have conceived of the novel combination by which a battery with low irreversible capacity and excellent high rate discharge characteristics, even when the negative electrode of the battery has a carbon density of not less than 1.6 g/cm<sup>3</sup>, can be realized.

At best, the Examiner has attempted to show only that the elements (i.e., having a carbon density of not less than 1.6 g/cm<sup>3</sup> and a circularity of not less than 0.86) of the claimed invention are *individually* known without providing a *prima facie* showing of obviousness that the *combination* of elements recited in the claims is known or suggested in the art. Indeed, it is respectfully submitted that the new and unexpected results that can be achieved by the present invention evidences the criticality of the functional/structural interaction of the claimed combination, which have been unbeknownst to the cited prior art and which enables a solution to the previously discussed problem recognized only by Applicants.

The Examiner is directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard for establishing obviousness under § 103:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejection does not "establish *prima facie* obviousness of [the] claimed invention" as recited in claim 1 because the proposed combination fails the "all the claim limitations" standard required under § 103.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set

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forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

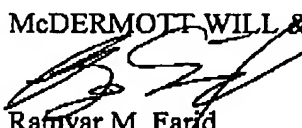
Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 102/103 be withdrawn.

**CONCLUSION**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below. To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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